Mount Diablo Astronomical Society

Diablo MoonWatch

July 2014

General Meeting

Tuesday July 22, 2014

The Known Distribution of Exoplanets in their Habitable Zones

by Arthur Adams

Doors open at 6:45 p.m.
Lindsay Wildlife Museum
1931 First Avenue,
Walnut Creek, CA 94597

Please park East of the museum, follow the instructions on the last page

I will describe the currently known distribution of both confirmed exoplanets as well as candidate planets from the NASA Kepler mission.

With respect to the fraction of the planets' orbital time spent within the habitable zones (HZs) of their host stars. Differences in the HZ subsets of both populations can be explained through past and present observational and target selection biases, and one can comment on the variety of planetary parameters which may lead to conditions favorable for liquid water on a planet's surface. Time permitting, I would also like to discuss a preliminary characterization of one validated and three candidate HZ Kepler planets whose sizes are close to Earth's. We find that the fraction of orbital time spent in the HZ depends

(Continued on page 3)

What's Up

Galileo's Telescopes

by Alan Agrawal

In 1608 the telescope was invented and in 1609 Galileo had begun construction of his own telescopes. In early 1610 he published Siderius Nuncius (the Starry Messenger) with his initial observations using his instruments. These observations ultimately caused a profound change in our view of the cosmos. In this talk we will briefly touch upon key historical points which lead to the invention of the telescope, and then focus on Galileo and the telescopes he built.

Images Taken by Mike Harms

The Moon was taken at our most recent public program on the mountain-July 5.

President's Corner

This Month's Club News and Commentary

by Jim Head

It's been a great summer so far, kicking it off with RTMC and the Starlight Festival, then with the recent Golden State Star Party, where many enjoyed observing Saturn, planetaries, and distant galaxy groups through some of the best personal telescopes on this planet!

Moving a little closer to home, the last Public Night on Mt. Diablo was wonderful, the moon was too bright but the atmosphere was clear and fairly steady, many good sights were seen. Unfortunately some little critters ate through the declination cables in the Paramount ME in MDOA's observatory so it wasn't available. Richard Ozer and Mike Lewis hope to have it in working order soon enough for the August 2 public night.

Comet Panstarrs 2012 k1 taken on June 29 by Mike Harms

Upcoming Events

Our next Society Night is July 26th, this is the best time to check out a scope if you are thinking of getting one, or, just want to look through other member's equipment to get a good view and learn more, or just to work on your own telescope. All MDAS members are invited to ALL Society nights.

We could use help for solar activities at the Hercules Library Saturday afternoon, July 19th.

Then another event the same evening as our Society Night on the 26th, at Rancho Laguna Park in Moraga, On Wednesday, July 30th, we will have the second of three Summer events at the Lindsay Wildlife Museum, for an evening of stargazing in Larkey Park, next to the Lindsay Wildlife Museum. Then two Public Nights in August, the 2nd and the 30th. If you can make any of these, signup on the Night Sky Network.

Hope to see you out there!

Jim

Taken at our most recent public program on the mountain-July 5, by Mike Harms

The Known Distribution of Exoplanets in their Habitable Zones (Continued from page 1)

considerably on properties of the planet and its orbit. This motivates the need for improvement in observational capabilities, in order to constrain these parameters and detect planetary atmospheres on a statistically useful scale.

Arthur Adams is a recent graduate of San Francisco State's graduate program in physics, researching the distributions of exoplanets in their habitable zones with Dr. Stephen Kane. Previously Arthur was an astrophysics undergraduate at Brown University, and will be starting school to work on his PhD at Yale University in the fall. His astronomical interests for the future include instrumentation to improve exoplanet detection, modeling of exoplanetary atmospheres, and studying stellar activity of exoplanet host stars.

M31 taken by Michael Lewis

12 x 5 minute light frames stacked in Nebulosity. Processed by Stuart Foreman with CCD stack, Photoshop, and Colormancer freeware noise reduction.

Forces of Martian Nature

by European Space Agencxy

The surface of Mars is pocked and scarred with giant impact craters and rocky ridges, as shown in this new image from ESA's Mars Express that borders the giant Hellas basin in the planet's southern hemisphere.

Perspective view of Hellespontus Montes

Hellespontus Montes in context

The Hellas basin, some 2300 km across, is the largest visible impact structure in the Solar System, covering the equivalent of just under half the land area of Brazil.

The images presented here were taken on 13 January 2014 by the high-resolution stereo camera on Mars Express and feature a portion of the western rim of the Hellas basin, which slopes into the foreground. This view highlights the Hellespontus Montes, a rough chain of mountain-like terrain that runs around the rim of the basin, seen here as an uneven ridge curving across the top of the main colour, topography and 3D images, and extending to the right in the perspective view.

This feature is a product of the final stages of the formation of the vast Hellas impact basin itself, most likely as the basin walls – which were first pushed outwards by the extraordinary forces at work during the formation of the basin – later collapsed and sank inwards to create the observed stair-stepped shape.

Hellespontus Montes topography

Several craters throughout the scene display wrinkled and rippled features: the close-up of the crater in the foreground of the perspective view highlights a particularly interesting example where the wrinkles form a roughly concentric pattern, with ever-smaller arcs towards the structure's centre.

This type of feature is known as 'concentric crater fill', and is thought to be associated with snowfall and freezing cycles in an earlier and wetter period of martian history.

During this period, snow fell and covered the surface and later moved downhill into the crater. Once inside the crater, the snow became trapped and soon covered by surface dust, before compacting to form ice.

The number of concentric lines indicates many cycles of this process and it is possible that craters like these may still be rich in ice hidden beneath just tens of metres of surface debris.

Hellespontus Montes

Meanwhile, the largest impact crater in the image (top left in the main colour, topography and 3D images) shows a degraded, layered crater deposit with several 'islands' of material that have been eroded by powerful winds.

Here and elsewhere in the scene, the formation of dunes building up around impact structures and at the base of Hellespontus Montes further indicates the role of strong winds shaping this scene.

Last but certainly not least, intricate valleys lead down from the Hellespontus Montes and weave through and across the smoother surrounding plains.

This complex region shows that many of nature's forces have left their mark here over time, from the formation of the Hellas basin billions of years ago, to the slow and steady changes created by wind and snowfall over millions of years.

Mount Diablo Astronomical Society Event Calendar–July 2014

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
		1	2	3	4 ◑	5 7:30 PM Public Astronomy:Sun/M
6 sunset: 19:19	7 7:30 PM Board Meeting (Private)	8	9	10	11 ●	12
13 sunset: 19:11	14	15	16	17 7:00 PM MDAS Imaging Meeting (Private)	18 ◑	19 7:00 PM Observatory Maintenance (Private) 1:30 PM Hercules Library
20 sunset: 19:06	21	22 7:15 PM GenMtg: Exo-planets	23	24	25	26 ● 7:30 PM Society Observing (Private)
27 sunset: 19:01	28	29	30 8:00 PM LWM Public Stargazing	31		

Mount Diablo Astronomical Society Event Calendar–August 2014

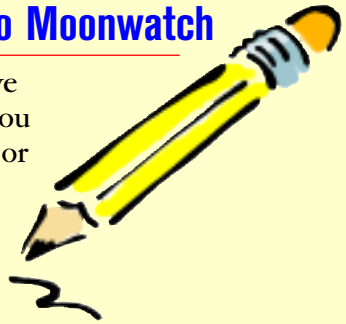
SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
					1	2 7:30 PM Public Astronomy Rocks
3 sunset: 18:54	4	5	6	7	8	9
10 sunset: 18:45	11 7:30 PM Board Meeting (Private)	12	13	14	15 7:00 PM Yosemite Astronomy	16 7:00 PM Yosemite Astronomy 7:00 PM Observatory
17 sunset: 18:36	18	19	20	21 7:00 PM MDAS Imaging Meeting (Private)	22	23 7:30 PM Society Observing (Private)
24 1:00 PM Solar at the LWM sunset: 18:26	25	26 7:15 PM GenMtg:The Keck telescope	27	28	29	30 7:00 PM Public Astronomy:MilkyW
31 sunset: 18:15						

Share your news with other members through the Diablo Moonwatch

We are always looking for new articles, images or photos and content. If you have astronomical perspectives or experiences to share with your fellow members that you would us to consider, please feel free to contact me Jim (jamesnhead@comcast.net) or our newsletter editor Vianney. (veloroute@hotmail.com)

Clear skies!

Jim and Vianney



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General Meetings:
Fourth Tuesday every month, except on the third Tuesday in November and December. Refreshments and conversations at 6:45 pm; Meeting begins at 7:15

Where:
Lindsay Wildlife Museum
1931 1st Avenue
Walnut Creek, CA 94597
(925) 935-1978
wildlife-museum.org.

Directions to facility:
From the North: Take 680 South to Treat Blvd. exit. Turn left at light onto North Main St. Turn right on Geary Road. Turn left on Buena Vista. Turn right on First Avenue. The museum is halfway up the block on the left.

From the South: Take 680 North. Take the Treat Blvd./Geary Road exit and turn left over freeway. Go three more lights and turn left on Buena Vista. Turn right on First Avenue. The museum is halfway up the block on the left.

Parking:
The museum is located in a residential area. There are no parking fees nor meters. Please park only in the museum parking lots on the east side of the museum, the Friends Church lot across the street (except Sunday mornings) or on Buena Vista Avenue. Please do not park on First Avenue in front of our neighbors' homes — you will get a parking ticket.